OPERATION OF DUAL FUNCTION CONTAINMENT ISOLATION VALVES

SALP FUNCTIONAL AREA: OPERATIONS (OPS)

APPLICABILITY: This Temporary Instruction (TI) is to be performed at the following PWR power reactor facilities: ANO2, FARLEY, VOGTLE, CATAWBA, and COOPER.

2515/136-01 OBJECTIVES

The objective of this TI is to obtain information to determine if the licensee has procedures in-place to remotely close the containment isolation valve whether or not a "Containment Isolation" or "Safety Injection" signal is "sealed in" relative to the ESF function.

2515/136-02 BACKGROUND

The safety system containment isolation philosophy for dual function containment isolation valves appears to vary within the designs of operating plants. A discussion of the staff's position on this issue follows:

There are two possibilities for a dual function containment isolation valve. The system which contains the containment isolation valve can have either a non-safety or safety related function as a process flow path but in both cases the containment isolation function would be safety related. For the non-safety related system, any signals generated for the system operation of the flow path are a non-safety related function and have no priority over a containment isolation signal. Therefore, when a containment isolation signal is generated, it immediately overrides the system flow path signal and closes the containment isolation valve.

For the safety related systems, the process flow path signals generated for system operation (i.e., in the case of a ECC system, this would be a safety injection signal) are safety related. Unlike a non-safety related system, the safety system function does not cease when the need for containment isolation is identified. The safety related process flow path function takes priority over containment isolation function. As long as the system is able to perform its safety function, containment isolation should not be implemented. However, if the system is not able to perform its safety function, then containment isolation becomes its number one priority.

By having the safety system process flow path function take first priority the need for automatic containment isolation is deferred for that system. Remote

manual isolation is a normal mode for containment isolation in this type of system. Once it is determined that the safety function of the system or train is not operable, containment isolation becomes the number one priority for the containment isolation valve. The operator should have procedures and be trained to properly isolate the system which means closing both containment isolation valves in that system or train.

The requirements to isolate means that the function is normally fully safety grade. This means that the instrumentation, motive power, actuator, and valve is all safety grade. If the valve is motor operated, it should be Class 1E powered. For air power, the valve should either close upon loss of air supply or the supply should be considered essential which generally implies an adequately sized accumulator that will assure valve closure for at least 30 days.

To identify a dual functioning containment isolation valve, the valve would be listed as a containment isolation valve within the FSAR table of isolation valves. The dual function containment isolation would not receive a automatic containment isolation signal to close but would have remote manual operation in the control room listed in the FSAR table. The staff considers remote manual closure in the control room as fulfilling the containment isolation function for these dual function valves. However, the staff has recently become aware of the fact that some plants with remote manual closure capability in the control room are not able to close the containment isolation valve when a safety injection signal is present.

As additional background information, attachment 1 contains a memorandum with more detailed information on a specific plant design and identified problem. The information provided in this background section above and in the attachment 1 are not intended to be used as inspection criteria. This information is provided only to enhance the inspector knowledge. The memorandum has been placed in the PDR and may be given to any interested party.

2515/136-03 INSPECTION REQUIREMENTS

03.01 Complete and answer the questions on Attachment 2, "Survey Form For Dual Function Isolation Valves."

2515/136-04 GUIDANCE

The information obtained in Attachment 2 will help identify a potential emerging issue related to dual function containment isolation valves. The Severe Accident and Containment Systems Branch developed the questions to identify specific concerns that may be indicative of: (1) The ability of the operator to close the containment isolation valve from the control room or (2) the ability of the operator to know what steps to take from outside the control room to close the affected containment isolation valves. The inspector should ask these questions of the licensee. A "no" answer to any of the questions is a possible indication of a regulatory concern that may warrant further assessment. If a licensee provides a "no" answer to all of the questions below other than the first question or if you would like additional information regarding any of the questions, please contact Jack Kudrick at 301-415-2871 or Tony D'Angelo at 301-415-2857.

2515/136-05 REPORTING REQUIREMENTS

Document the results on Attachment 2 and fax (301-415-3707) or mail them to Jack Kudrick or Tony D'Angelo, OWFN, mail stop O-8-H-7. If you have any questions, comments, or require additional information please call Jack Kudrick at 301-415-2871 or Tony D'Angelo at 301-415-2857. Since this is an information gather TI for NRR, include a short paragraph in a routine inspection report discussing the inspection effort. Do not the attachment in the inspection report.

2515/136-06 COMPLETION SCHEDULE

Complete inspections by November 3, 1997.

2515/136-07 EXPIRATION

This temporary instruction will remain in effect until December 1, 1997.

2515/136-08 CONTACT

Address questions concerning this TI to Jack Kudrick at 301-415-2871 or Tony D'Angelo at 301-415-2857.

2515/136-09 STATISTICAL DATA REPORTING

Record Actual inspection time for this TI against 2515/136 for RITS reporting.

2515/136-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility. The Severe Accident and Containment Systems Branch (SCSB) originated this temporary instruction.

10.02 Resource Estimate Estimated inspection effort for this TI is expected to take 20 hours per site.

10.03 Followup Inspection Use IP XXXXX for inspection followup to this TI.

2515/136-11 TRAINING

No special training is planned for the conduct of this temporary instruction.

END

Attachments:

1. Task Interface Agreement - Waterford
2. Survey Form

MEMORANDUM TO: William D. Beckner, Director
Project Directorate IV-1
Division of Reactor Projects II/IV

FROM: Carl H. Berlinger, Chief
Containment Systems and Severe Accident Branch
Division of Systems Safety and Analysis

(ORIGINAL SIGNED BY CH Berlinger 4/10/97)

SUBJECT: TASK INTERFACE AGREEMENT (TIA) - WATERFORD 3 REQUIREMENTS FOR THE CAPABILITY OF CONTAINMENT ISOLATION VALVES TO CLOSE TO MAINTAIN CONTAINMENT INTEGRITY (TAC NO. M97234)

The purpose of this memorandum is to respond to a Region IV request dated November 13, 1996. The request was to review the licensee's position on compliance with the General Design Criteria for dual function (i.e.,open safety function on a safety injection actuation signal and/or containment function to isolate the containment) air-operated containment penetration valves.

Before addressing the specific designs, one needs to understand the roles of a system safety function and containment isolation function. In general, a system which penetrates containment has an important role to play in the overall operation of the plant. Some perform a safety function in a pre/post LOCA manner while others are important to the overall operation of the plant. In either case, however, the requirement to perform a containment isolation function is the same. Containment isolation is always considered to be a safety function. The only remaining question is when the isolation function needs to be performed.

Let us reverse the order and first discuss the role of the containment isolation valves for a non-safety system. For this system class, it is normally assumed that the need for the system function ceases when the need for containment isolation is identified. Receipt of a containment isolation signal will cause the containment isolation valves to automatically actuate. This satisfies the containment function while at the same time ending the normal functioning of the system.

The safety system containment isolation philosophy is quite similar. The difference relates to the priority of the function. Unlike for a non-safety system, the safety system function does not cease when the need for containment isolation is identified. The safety function simply takes priority over containment isolation. As long as the system is able to provide its safety function, containment isolation should not be implemented. However, if the system is not able to perform its safety function, then containment isolation becomes its number one priority.

Contact: J. Kudrick, SCSB/DSSA
415-2871

By having the safety system function take first priority eliminates the need for automatic containment isolation. Remote isolation is the accepted mode for this type of system. With remote isolation capability, however, comes the need to know when isolation is needed. This generally means leak detection and some means to determine system operability.

Once it is determined that the safety function is not operable, containment isolation becomes the number one priority. The operator is trained to properly isolate the system which means closing both containment isolation valves.

Now let us look at the requirements to isolate. The function must be fully safety grade. This means that the instrumentation, motive power, actuator, and valve must be all safety grade. If the valve is motor operated, it should be Class 1E powered. For air power, the valve should either close upon loss of air supply or the supply should be considered essential which generally implies an adequately sized accumulator that will assure valve closure for
30 days.

Therefore, for systems with a dual requirement, the valves can and probably will have a two position criteria. To satisfy the safety system function, the valve position should be open. However, to satisfy the containment isolation function, valve position should be closed. To simply look at the safety system function to establish valve position meets only half of the valve requirements. Additionally, to power the valve actuator with a non-safety air supply is unacceptable when the failure position is open since the containment isolation function cannot be satisfied.

With this brief background, one can now discuss the specific questions contained with the TIA request. Specifically, Region IV has identified the following questions;

QUESTION 1

Does the licensee comply with the requirements of Criterion 57 (i.e., do the containment spray and component cooling water containment penetration valves have a closed safety function? In particular, are the air-operated valve accumulators required to maintain the valves closed on a loss of non-safety related instrument air?

RESPONSE

The valves in question have dual requirements. For the system safety function, the valves have an open function to assure the operability of the system when needed. However, the valves also have a containment isolation function when called upon. Under this sequence, the valves have a closed function. As discussed above, the system safety function has first priority. Therefore, the fail open design is appropriate. But, the containment isolation function is equally important when the situation calls for isolation. This means that the air supply should be safety grade to minimize the times when one loses the air supply to the valve which also loses the containment isolation function. The design needs safety accumulators to assure an air supply in the event of loss of non-safety instrument air. For this reason, it is unacceptable to have non-safety instrument air without a safety backup system.

QUESTION 2

Would similar valves for containment penetrations subject to the requirements of Criteria 55 and 56 also have a closed safety function for containment isolation, even if, the position of greater safety of the valve is to open?

RESPONSE

All containment isolation valves subject to the requirements of Criteria 55 and 56 have a closed safety function. However, it is quite misleading to state that the position of greater safety of the valve is to open. These valves under discussion have a dual requirement; performance of the system safety function and the containment isolation function. Each function is a separate responsibility. Therefore, for the system safety function, the position of greater safety is open. But for the containment isolation function, the position of greater safety is closed. Since the system function has first priority, the valve should fail open upon loss of air. However, since the containment isolation position of greater safety is closed, the air supply should be as reliable as possible to minimize the probability of the loss of air. This is translated to mean safety grade.

QUESTION 3

Is the licensee required to have the capability of remote manual closure of the containment penetration valves with a safety injection actuation signal and/or containment spray actuation signal present?

RESPONSE

The simple response is yes. The licensee is required to be able to remotely close the valve at any time during the transient. This is particularly important if the safety system has a burned in signal to stay open to maintain the safety system function. The solution is to design the logic such that a switch in the control room can be actuated to over ride this open signal. An example of such a design can be found on the containment isolation valves connected to an external recombiner. Normally the valves are in a closed position. To allow the recombiner to become operational, these valves must be opened even though there exists a containment isolation signal. This override logic eliminates the need to jumper the connections within the control cabinet which would be necessary without this control logic.

Equally important to the ability to change valve position is knowing when to initiate containment isolation. Sufficient instrumentation should be available to the operator for this purpose. This would include leak detection as well as sufficient discrimination to determine which system is leaking.

QUESTION 4

If the answer to Question 3 is yes, are manual actions an acceptable means of meeting this requirement?

RESPONSE

Manual action is an acceptable means for meeting this requirement. But, it should be remote manual and normally from the control room.

With respect to the acceptability of the accumulators that exist within the plant, we are currently discussing this issue with the licensee. We will report resolution in a future amendment.

DISTRIBUTION:
CPatel
NRC File Center
SCSB r/f (2)
PDR

ATTACHMENT 2

SURVEY FORM FOR DUAL FUNCTION ISOLATION VALES

PLANT NAME: _____

INSPECTOR'S NAME: _____

PHONE #: _____

PLEASE COMPLETE THE FOLLOWING QUESTIONS.

1. Identify the dual function valves as listed in the FSAR. Please verify with plant staff if other dual function valves exist in the plant. Please attach copy. Are differences noted from the FSAR? yes or no.

2. In the presence of a containment spray or safety injection signal to open the valve, can the CONTAINMENT ISOLATION valve be closed from the control room with a switch and remain closed? yes or no.

3. If the answer to 03.02 is no, in the presence of a containment spray or safety injection signal to open the valve, are there procedures which the operator can use to close the valve via other methods (such as de-energizing circuits or lifting leads or installing jumpers) remote from the valve? yes or no. If yes, provide a copy of the procedure.

4. If answers to 03.02 and 03.03 are no's, is there any other means that the licensee has to close the isolation valve? yes or no.

Please fax (301-415-3707) or mail (08-H-7) to Jack Kudrick or Tony D'Angelo.

END